

### ABSTRACT OF THE DISCLOSURE

A method and apparatus for etching a magnetic memory cell stack are described. More particularly, HCl is used as a main etchant gas for etching a magnetic memory cell stack. HCl is used in part to reduce corrosion and improve selectivity. Additionally, use of an amorphous carbon or hydrocarbon based polymer resin for a hard mask is described, as well as a post-etch passivation with a water rinse, a water vapor plasma treatment or an ammonia plasma treatment. Moreover, in an embodiment, a diffusion barrier layer disposed most of the magnetic memory cell stack is etched with hydrogen and fluorine containing gas in a separate process chamber.